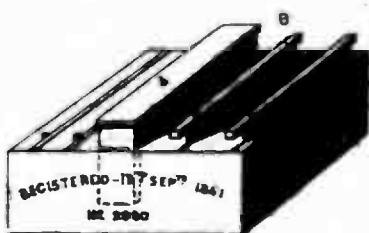
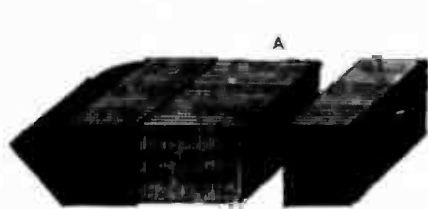


SCOTT'S AIR REGULATOR AND AIR STRAINER.



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THE desideratum in ventilation is to supply apartments with air duly fitted for respiration without draughts. An attempt to supply this has been made by Mr. Scott, of Exeter, who has registered an improved air regulator with air strainer, which admits no air into the apartments until it has been filtered and deprived of blacks, dust, and dampness. Annexed we give illustrations of the arrangement, which the following particulars will fully explain:—

A—A wood or metal frame or case with radiating valve (which contains the improved part) to be fixed in the wall.

B—Represents the improvement, an oblong square wood or metal frame or case, with perforated metal slides to be removed for cleaning; the centre one is also a moveable frame containing hair and wool or any other fibrous substance to strain the air as it enters the apartments.

C—A section of the whole when fixed in the wall, made of a variety of sizes as cases may require.

a a a—Loose perforated metal slides for the purpose of cleaning the plates, &c.

b—A moveable frame containing hair and wool or any other fibrous substance to strain the air.

It answers exceedingly well in one case of which we have a knowledge.

STEAM POWER CARPENTRY.*

As the present century has witnessed many additions to the number of woods applied to useful and ornamental purposes, and many excellent modes of preserving timber from decay, so has it been equally prolific in new modes of fashioning timber for practical uses.

The "top sawyer" at present is certainly the steam-engine, and such seems likely to continue to be the case. Year after year steam power becomes more and more employed in cutting bulky timber into planks and staves. It is said that there are no fewer than seventy steam saw-mills in and near the metropolis. These supersede to an unequal degree the labours of hand sawyers: the latter are grouped in four classes—timber sawyers, hard-wood sawyers, coopers' sawyers, and ship sawyers; and the steam-engine is applicable to some of these kinds of labour more than to others. The hard-wood sawyer has to exhibit much tact and skill, since the valuable furniture and cabinet woods on which he is employed have to be economised as much as possible. The coopers' sawyers cut the staves for casks, a kind of work which is now sometimes accomplished by cask-making machines. The ship sawyer cuts the curiously twisted timbers for a ship, the curved surfaces of which require much care on the part of the sawyer. But the common timber sawyer, who prepares the deals and other common woods for carpentry and similar purposes, is the one whose labours are most likely to be superseded by dumb agency: the work is coarse, hard, monotonous, and requires very little thought.

From the earliest times of which we know anything definite, the sawing of timber has

been performed pretty much in the same way: the paintings and bas-reliefs in Egypt tell us thus much. The top-man and the pit-man, the pit and the scaffold, are what they have been for centuries, with very little modification. Every one must see that the labour at a saw-pit is of a very severe kind. In one of the remarkable papers published in the *Morning Chronicle*, some months ago, on the Labourers of London, a sawyer's estimate of his daily physical exertion is given. In the first place, he says that his saw weighs from 60 to 70 lbs., that it is about 7 feet in length of blade, and that he and his partner make about ten strokes a minute: this is equal to 70 feet per minute, or 4,200 feet per hour, or 42,000 feet in a day of ten hours: in other words, two men lift 60 to 70 lbs. nearly eight miles high in the course of a day's work. But this is only half the labour, perhaps less than half: in the up stroke the men have only to lift the saw, but in the down stroke the teeth catch like so many sharp hooks in the substance of the wood, and tear it away by main force. The sawyer was too unlearned to estimate the amount of this force, but he had heard "a scientific man calculate and reckon" that it was equal to lifting 86 lbs. If this be correct, it more than doubles the former figures, and presents a formidable appearance. Even supposing the sawyer and his scientific informant to have been not strictly accurate, there is abundant room for thinking that the labour must be severe, and that it is a kind peculiarly fitted to be brought within the scope of steam power.

For a few years before and after the commencement of the present century horse power was occasionally used to facilitate the labour of sawing; but it was about forty years ago that the first steam saw-mill was established near London. The horse-mills were abandoned, partly through the opposition of the sawyers, but more effectively through the system being non-remunerating. The steam-mills have proved to be efficient and advantageous, and have been increasing in number year by year. In most steam saw-mills there are three frames of about nine saws each: this may be taken as an average. The straight saws, which have a reciprocal or up and down motion, make 150 to 180 cuts in a minute; while the circular saws, usually from 18 to 36 inches in diameter, have a revolution of 1,500 to 2,000 times in a minute—a speed which enables them to cut through wood with great ease and rapidity. The teeth are much finer than in the saws used by pit-sawyers, and therefore cut cleaner: being subject to more regular and precise action, they need not be made of such highly-wrought steel as pit-saws, and are on that account cheaper; and in cutting a given quantity of timber, a machine-saw requires sharpening less frequently than a pit-saw—three points of advantage which the new fashion has over the old. Among the curious calculations connected with this subject, one is, that every tooth of an 18-inch circular saw, working at average speed for ten hours a day, travels 900 miles in that time.

But veneers are the forms into which a steam-mill best shows its power of sawing timber. It is in fact now entirely a machine process in this country: The late Sir M. I. Brunel—that extraordinary man, whose in-

ventive mind produced such fruitful results in a professional career of half a century—was the parent of the saw-mill. He invented it about forty years ago, patented the invention, and leased the use of the patent to many different persons. This was for timber-sawing only; but his ever-active mind did not fail to see the applicability of the method to veneer-sawing. He spent two years in the endeavour to surmount unexpected difficulties which presented themselves: he did surmount them; and veneer saws have ever since remained nearly as he left them. He, with one or more partners, established a veneer sawing-mill at Battersea: the mill is still at work, but has passed into other hands.

It is really a beautiful example of mechanical action which is presented by this veneer sawing. So unerringly are the thin plates cut, let the grain of the wood be hard or soft, straight or twisted, that the use of veneers is becoming more and more extensive every year. Not merely mahogany and rosewood, for ordinary drawing-room furniture, but satin-wood, Amboyna-wood, zebra-wood, tulip-wood, ebony, Coromandel-wood, maple, cedar, sandal-wood, king-wood, and other foreign woods, are similarly cut. Nay, our own English oak, yew, elm, ash, birch, walnut, sycamore, &c., are wrought into thin films by similar means. The logs of wood, when about to undergo the sawing process, are first brought to a tolerably clean surface by the adze or the plane, and are then firmly fixed into a frame. The veneer-cutting saws are of enormous size, some of them reaching to seventeen feet in diameter: they are circular, and are built up of several pieces of steel; for it is found that a single plate has a tendency to become distorted by the heat generated during sawing. The adjustment of the saw is most extraordinary for its exactness. Let us consider that as many as fifteen veneers are occasionally cut in an inch, and that any deviation from parallelism would render them ragged and useless: we can then conceive what nicety of arrangement is required. The saws rotate with great velocity: the log moves on by automatic machinery to meet the saw-cuts: the sawdust falls to the ground in fine powder; and the aroma from the wood (for each kind of wood has its own peculiar aroma when heated by the friction of the saw) fills the apartment. Thus is veneer-cutting now conducted; and when we are told that the machine can cut nearly twice as many veneers in an inch as the most skilful sawyer, we see ample reason for the change in the working economy of this trade. The English usually adopt the method here described; but on the Continent a singular mode is practised of cutting a continuous veneer in a spiral form: the English plan wastes a little more wood, but yields stronger veneers than the foreign. There is a film of ivory veneer in the United States department of the Exhibition, forty feet long by a foot in width, produced by cutting the task spirally or in snail-like fashion.

Like most other steam-power operations, timber-sawing now undertakes more than it was once thought capable of effecting. The elder Brunel thought he had wrought a great work (and it was a great work) when he showed how to saw a huge log into planks by steam power; but modern inventors are not satisfied

* From Dodd's "Curiosities of Industry." C. Knight, Fleet-street.